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HASTINGS
ON
YELLOW FEVER

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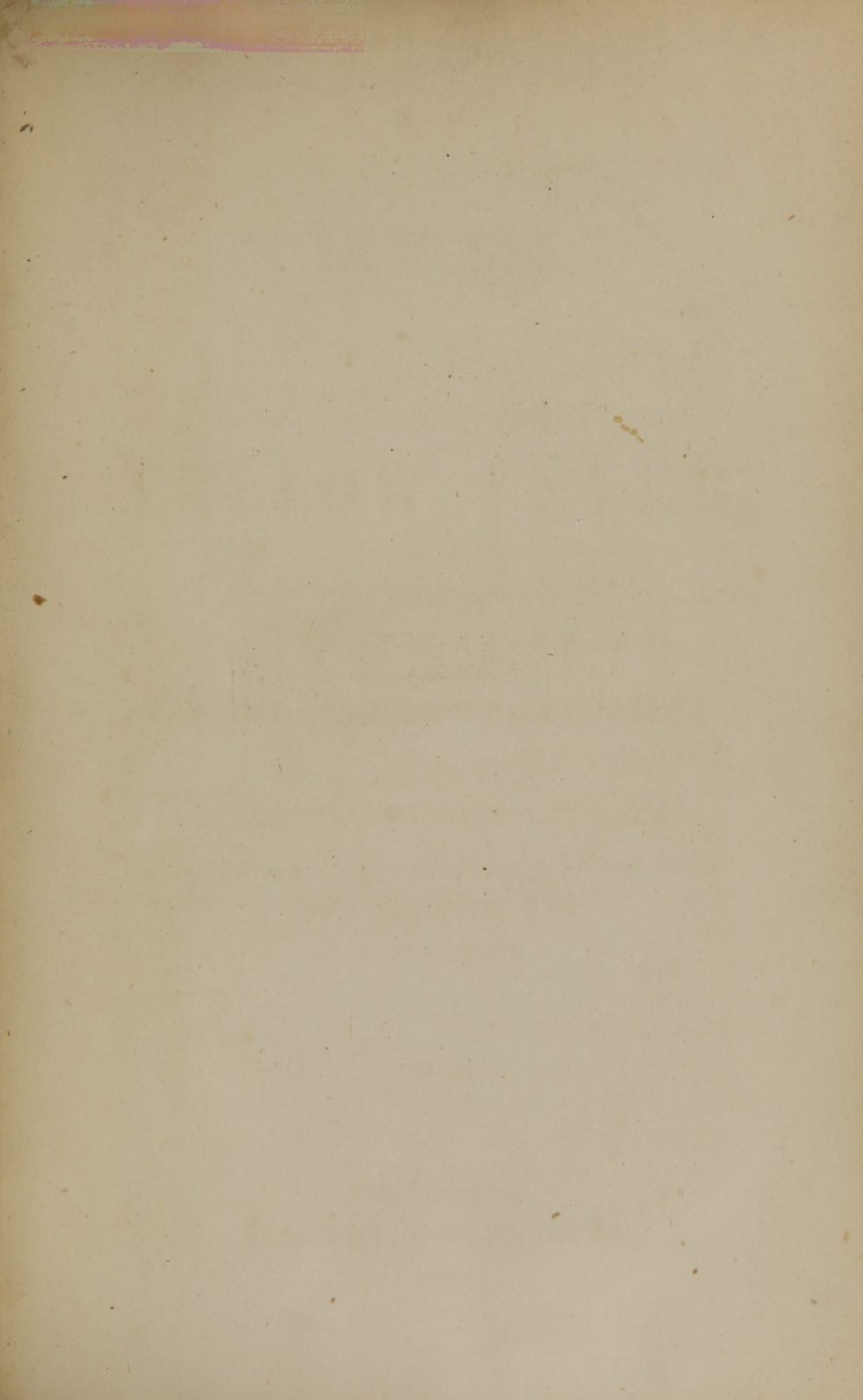
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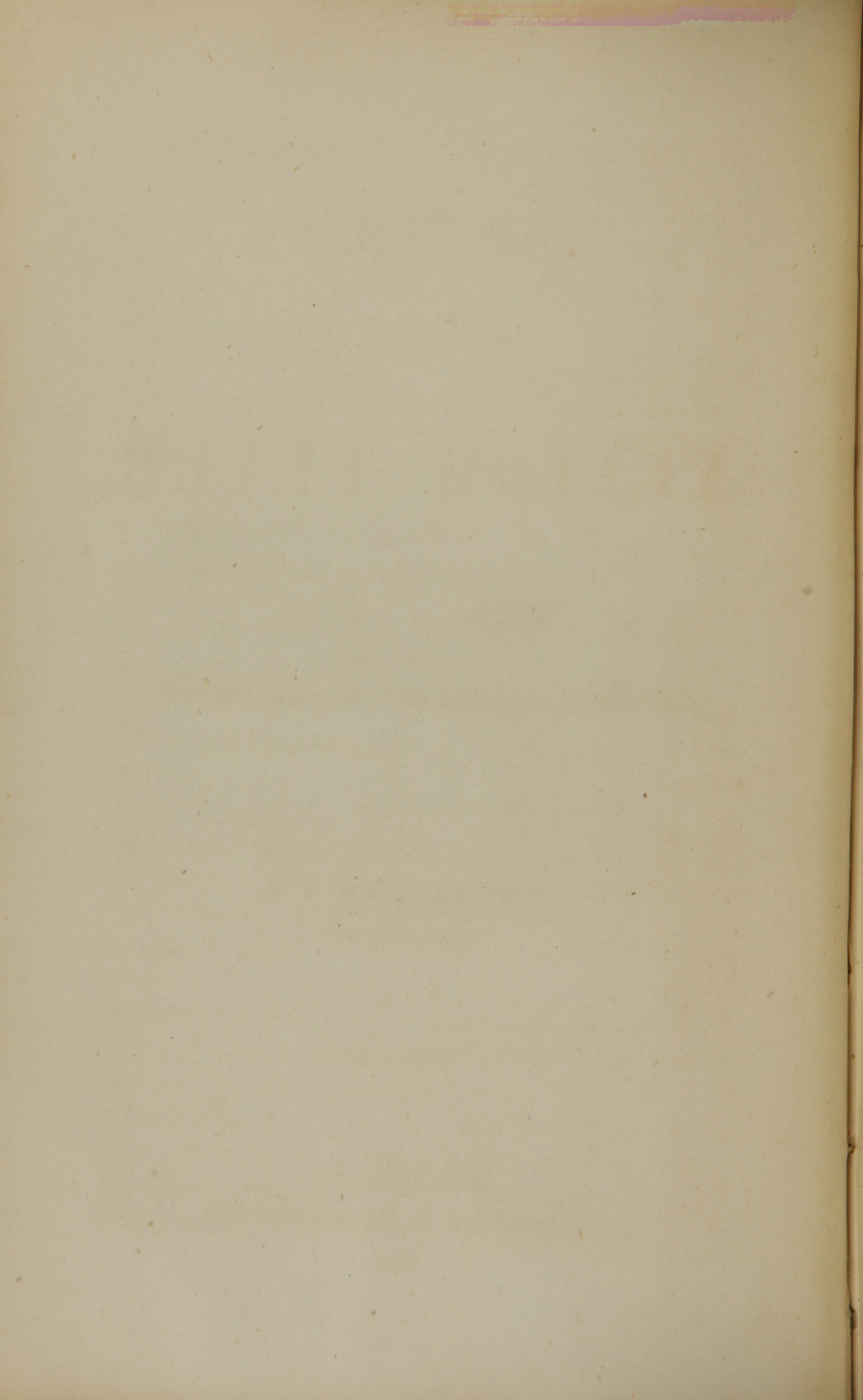
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LETTERS

YELLOW LEAF

THE HISTORY OF THE

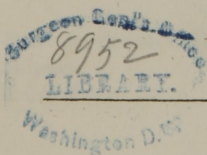
THE HISTORY OF THE

THE HISTORY OF THE

LECTURES
ON
YELLOW FEVER,
ITS
CAUSES, PATHOLOGY & TREATMENT,

BY
JOHN HASTINGS, M. D.,

UNITED STATES NAVY.



PHILADELPHIA:
LINDSAY & BLAKISTON.
1848.

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In the Clerk's Office of the District Court in the Eastern District of Penna.

WILLIAM S. YOUNG, PRINTER.

Philadelphia, *March 22, 1848.*

DR. JOHN HASTINGS, *U. S. Navy*,—

Dear Sir:—Having been much gratified by hearing your interesting lectures on Yellow Fever, we, the undersigned, represent the wishes of the whole audience, in requesting you to furnish us with a copy of those lectures for publication. With sincere regard,

Very truly, yours, etc.

W. DARRACH,
V. L. GODON,
A. M. LYNNAH.

Philadelphia, *March 26, 1848.*

GENTLEMEN:—

I cannot deny your request, if you think this paper is capable of subserving the least good purpose. I therefore furnish it without reserve, trusting more to the judgment of the gentlemen who ask its publicity than my own. I remain, gentlemen,

Very respectfully,

Your obedient servant,

JOHN HASTINGS.

To

Dr. W. DARRACH, Prof. of Practice, Penna. College.

“ V. L. GODON, of Philadelphia.

“ A. M. LYNNAH, of South Carolina.

Philadelphia, March 22, 1842

Dr. John H. Brown, C. S. D.

Dear Sir:—Having been much troubled by a severe cold, I have been unable to attend to your letter of the 19th inst. in relation to the matter of the subscription. I am, however, very anxious to see the work, and will endeavor to do so as soon as possible.

Yours truly,
W. L. Brown
A. M. Brown

Philadelphia, March 22, 1842

Dr. John H. Brown, C. S. D.

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Yours truly,
W. L. Brown
A. M. Brown

W. L. Brown, C. S. D.
A. M. Brown, C. S. D.

LECTURES

ON

YELLOW FEVER.

Having been thrown in the midst of Yellow-Fever on several occasions, and yielding to the solicitation of my medical friends, I have concluded to prepare the following paper upon the subject.

The views herein embodied, were not hastily arrived at; nor were the deductions drawn from slight and insufficient data; neither were the conclusions leaped at without due reflection, but on the contrary, they are the result of close and long continued observation, and laborious research; and the conclusions drawn from ample opportunities, and after the lapse of much time; giving in this brief form the results of observations, carefully made on five separate occasions; in four of which, the disease was met in epidemic, and once in sporadic form; the localities being widely separated: consequently, the following opinions were formed after the careful watching and examination of many hundreds of cases; I will not say thousands, for that might sound extravagant: but certainly, from very many hundreds.

In the epidemic of last summer, in the Gulf of Mexico alone, I was engaged in the management of nearly or

quite twelve hundred cases. Thus, after examining the effects of the disease in more than one clime, I have compiled the following condensed account of it, wishing to be as laconic as possible, consistent with perspicuity; and if any light be thrown on this fatal disease, or the least good result to the profession by this effort, I will feel myself fully compensated.

Unfortunately, this disease rests in much obscurity at present; a difficulty not inherent in the subject, but owing to our own want of research and investigation, and too great yielding of opinion to European authorities.

Thus, M. Louis' ideas are made the constant criteria of this disease, from the fact that he once saw it.

Having been sent, one of a commission by the French government, to investigate the epidemic at Gibraltar, in 1828; which epidemic seems to have been rather a bilious remittent, such as we have frequently here, (and which ran a very fatal course but two years since,) than pure Yellow Fever; at least, one might judge so, from his own writings: for he says, "As then a strict analysis of the anatomical appearances of the Yellow Fever of Gibraltar, of 1828, proves the existence of a cause unequal in its operation, and of which but one effect is constant, the specific alteration of the liver, and as in a third part of the cases, it is directly to this cause that we are obliged to refer the death, we naturally ask how does this act, through the medium of what system does it exert its influence on the economy?"

Again, he says, "that the severity of the symptoms does not correspond always with that of the lesions."

"Of these last, one only was constant, the specific alteration of the liver."

"The inflammatory state of the mucous membrane of the stomach, comes next in frequency, and sometimes explains in a manner sufficiently satisfactory, the symptoms that had been observed."

Dr. Frank defines Yellow Fever to be "an erysipelatous and gangrenous inflammation of the viscera of the abdomen and other cavities ; sometimes, but not always accompanied with black vomit, and an icterode condition of the skin." But Dr. Stevens, a high authority, informs us, "that we have three Yellow Fevers in the western hemisphere ; that one arises from excessive heat, and is not contagious, another arises from heat and malaria together, and the third is contagious, and has its cause in the emanations from the bodies of those affected." These are but three of the many authorities, whose opinions have governed all our views in regard to this fever.

Certainly, we who are so frequently among this disease, should know more about it than Europeans, who have not the same opportunities for studying it as ourselves.

I presume American intellect, when properly instructed, is as capable of investigating disease and judging of its causes and effects, as any other ; for we have access to all the channels of information which the world affords, and certainly we should not doubt our own powers so much, as to neglect the closest investigation of nature in this disease, which should be one of the greatest importance in the mind of every American physician, since this scourge shows itself yearly in sections of his country ; sweeping off hundreds, and spreading with such fearful rapidity, that when once it shows itself, leaving no time for the medical man then to make himself acquainted with

its proper management. It should therefore be well comprehended, if possible, before encountered. And this is not impossible, if proper views upon the disease be the subjects of reference and study. Few, however, have been as considerate as Mr. Watson, who, never having seen the malady, wisely refrains mention of it. It must be to this fact that we should attribute its obscurity and contradictions; from no other cause can I even imagine why there should be any serious discrepancy: for it is a disease of easy comprehension, and great distinctness of character. Having no theory to support, I will present the disease as it manifests itself to those who investigate and study it from nature.

Yellow Fever prevails in, and is generally confined to Africa, the West Indies, Mexico bordering upon the Gulf, and the southern portion of the United States, but extending frequently as far north as Philadelphia, New York and Boston, all of which places have been from time to time the theatres of its fearful ravages. It is to be hoped they may never again be visited by this affliction: yet the march of epidemics is capricious and well nigh incomprehensible, and a return of it is quite possible. Witness its late visit to the south, where it has raged in wider extent and greater fatality, than was ever known since the discovery of the country.

EXCITING CAUSES.

The exciting causes of this disease are variously stated. Dr. Good, in speaking of localities that give rise to it, says: "Such places, however, are numerous, as damp unventilated stations, stagnant water, thick impervious jungles, even high and arid hills, after heat and

rain; but above all, a foul state of the hold on board ships, whatever be the cause of such impurity." And Mr. Bancroft endeavoured to show that it was owing to decomposition taking place in the ballast of ships, or the putrid state of the bilge water.

Drs. Ferguson and Lind attribute its origin to intense solar heat, acting either per se, or on wet and marshy coasts. But Dr. Wilson has singularly enough endeavoured to show, that this disease is caused by the gaseous product neither of vegetable nor herbaceous matter, but of trees, shrubs, or of any sort of wood, in a state of decomposition. All this is as incomprehensible as the prevalent belief, in many countries bordering upon the Mediterranean, of the positive contagion of phthisis.

The experiments of Professor Julia, of Lyons, led him to conclude that "the deleterious influence of Koino-Miasmata, depends upon particles of putrid animal, or vegetable matter."

Animal effluvia, alone, is not equal to the creation of this disease. If it were, then wherever animal matter was found in large quantities in a state of decay, and undergoing putrefaction, there we would necessarily have the disorder prevailing. But upon the dry plains of South America, east of the Andes, we find immense masses of animal matter exposed to the sun and rain, in every state of decay and putrefaction. The ground being strewn for miles, with the carcasses of cattle, killed merely for their hides, and then left where they were felled, to rot. In many places they lie several layers thick, the atmosphere is filled with animal effluvia, and the air is tainted with the disgusting odour. Yet here Yellow Fever never prevails.

I feel perfectly satisfied in my own mind that there is but one cause capable of exciting this disease; and that cause is to be found in the malaria or exhalations from alluvial marshy soil, and that too from marshes subject to periodic inundation and draining. The period at which the poison is eliminated is after the draining of extensive marshes, and during the process of desiccation. Close attention to the subject, and well directed observation make this clear to the mind, wherever the disease is found in its endemic form, as it is only met with in such situations and at such times. This is clearly proven by the condition of things in the lower portion and marshy districts of Florida, where the disease is endemic, and often prevails to a frightful extent, and where it was my fate to see it in its worst form.

Now here we have the two conditions of soil brought in immediate contrast; viz: That constantly inundated, and that subject to periodic inundation and draining. And whilst the disease is frequently raging in one situation, it is never known in the other. Thus, when the men were operating in the everglades of Florida, during the late Seminole war, they were never attacked by the disease, whilst those kept outside upon the coast, and in the mouths of rivers, were sickening and dying of the fever.

The everglades are low marshy districts, having a coral base, deeply covered by decayed vegetable matter, and always covered by fresh water, being the sources of several rivers emptying into the sea.

Upon approaching the coast, however, from the interior, we find these marshes subject to periodic overflow-

ing and draining. And here alone we have the disease, and that too after the rainy season.

This, I believe, is also the case in every part of the West Indies where the disease prevails. And this was found to be true in Mexico, in the epidemic of last year: here also the disease is confined to the same condition of soil; for it is not found upon the elevated and dry lands; but always confined to the districts of drying marshes.

Indeed there is so little difficulty in the subject, that in the past season, the disease was predicted at the city of Tabasco, an alluvial marshy situation, eighty miles in the interior of Mexico.

Those who had seen much of the disease felt positive it would appear; judging from the topography of the country and the state of the weather, which had been very wet: heavy rains having fallen for some time, swelling the rivers and overflowing the low country. The rains then ceased long before their accustomed time; the country was drained, the solar heat unusually high, and the fever in due time made its appearance, and spread with such rapidity that in a short time two-thirds of our force were down with it. At length the place was abandoned on account of universal sickness. At this period it also appeared upon the coast, wherever the same condition of country existed.

Intermittent fever, I believe, is universally admitted to be the result of marsh miasmata. Now it is positively certain, that where yellow fever prevails, there also is found every variety of intermittent, and very generally all varieties of remittent and bilious fevers; these diseases, arising from the same cause by different degrees

of intensity of the poison. The cause of the varying qualities of this principle have never yet been explained, nor fully comprehended; although its effects are constantly observed.

It has been maintained that miasmatic matter is not conveyed by the atmosphere beyond a short and limited distance,—Mr. Bancroft says a quarter of a mile,—Dr. Eberle agrees with him in a quiescent state of the atmosphere, and this idea has given rise to the opinion of such various causes creating the disease, as well as accounting for its contagious character: taking it for granted that marsh effluvia cannot be conveyed beyond a short distance: therefore, other causes had to be found, and ingenuity was not slow in furnishing these. Thus, Dr. Chisholm states, that “ships containing wine in their holds in a state of decomposition, are generally extremely sickly, and the character of the prevalent disease is that of yellow remittent fever,” and observes that “several instances of this took place in Fort Royal Bay, in the years 1787 and 1788; and the situation of the ships in the open bay, far from the influence of marsh effluvia, precluded a suspicion of the fever from that cause.”

And consequently as miasmatic matter could not in his opinion be carried to that distance from shore, the exciting cause of the disease had to be looked for within the bulwarks of the vessel: and the same idea has been extended to cases where persons were presumed to have taken the fever on shore and then conveyed to their vessels, when others on board have afterwards contracted the fever, and that too when the vessels were presumed to be beyond the influence of effluvia from the shore; therefore, as a matter of course, it must have been taken

from those who brought it on board, and must be considered contagious for this reason.

I have never seen a single instance where there was the least cause to suppose that the fever originated on board ship; notwithstanding, I have frequently seen ships in the conditions said to give rise to it; and never saw it on board any of them, unless it was prevailing on shore; and then even I have seen vessels escape for a long time, which according to the views before quoted should have originated the disease.

Thus the *Raritan* frigate in the gulf of Mexico, in the summer of 1846, was in bad condition, having many of the requisites for the creation of the fever, according to Chisholm and others; yet not one case occurred on board, notwithstanding the very bad condition of her crew, who were suffering so much at the time from scurvy, that she was almost unmanned, as shown by the report of her surgeon, Dr. Foltz; but as there was no fever on shore that summer, she did not suffer in the least from it. Yet in the summer of 1847, when she was perfectly clean and in good order, without any of the so called exciting causes on board, and with a new and healthy crew, she was the very first vessel in the squadron to take the fever.

The U. S. steamer *Mississippi*, in the early part of the summer of 1847, had many of the conditions said to give rise to the disease, and was often so crowded for many days at a time with men, put on board for expeditions along the coast, that it was almost impossible to walk about the decks; still not one case of fever occurred at this time. But later in the season, when she had none but her own crew on board, and had become

clean, and the condition which is thought will give rise to the fever removed, her crew then took the fever, but not until it had at first appeared on shore.

Bilge water is maintained by some to be an exciting cause of the fever; but so far is this from being the case, that in the past summer the U. S. steamer *Vixen*, was so completely impregnated with bilge water, that the white paint in every part of her was blackened, and this gas was so constantly and profusely generated, that the officers and men had to abandon their apartments, and eat and sleep on deck; and still this vessel escaped the fever so long, that they began to think she would avoid it altogether; notwithstanding, the crew of nearly every other vessel in the squadron was paralyzed by it; and her crew was eventually the very last in the gulf that took the fever.

This idea, that malaria can only be carried a short distance, I apprehend is an error; but on the contrary, that it can be borne to very great distances by the air.

We can readily comprehend this, when we take into consideration to what immense distances from any land, infusoria have been collected upon the decks of vessels; for instance, ships running parallel to the coast of Africa, at the distance of one, two, and even three hundred miles from the coast, have had sufficient numbers of these small animals found upon their decks, to furnish demonstrations of many varieties of animalculæ.

Also minute fragments of stone, and various earths have lodged upon the sails of vessels, hundreds of miles from land; and is it not therefore reasonable to infer, that material marsh effluvia can be, and is conveyed to great distances through the medium of the air? I have

seen this take place, if it be possible to trace cause from effect.

In the past summer, there were a great many naval and merchant vessels lying at the anchorage at Anton Lizardo, (twelve miles south of Vera Cruz,) at the distance at least of three miles from the shore, with which there was no communication, and yet men were constantly attacked by the fever, notwithstanding they had not left their ships for a long time before the disease appeared.

Again, upon the Island of Salmadina, where the naval hospital was placed, (at Anton Lizardo also,) but removed not less than five miles from the Mexican shore, being a small coral island, perfectly dry and very healthy. Yet upon this spot there were men attacked by the fever, who had not been off it for weeks and months.

This may be taken as an argument in favour of the contagious character of the disease, but it is not so; since these cases only occurred during the prevalence of strong and continued breezes from the land, which invariably produced a great number of cases, and aggravated the symptoms of those already sick. The very reverse was the case during the prevalence of strong and continued breezes from seaward: these never failed to reduce the number of cases, and improve the condition of the sick, so that the prevalence of the winds became almost as certain an indication of the number and condition of the sick, as the thermometer of the temperature of the air; and the heat was excessive that season, as I believe it always is, when the fever prevails to any great extent: it ranged from 90° to 100° in the shade, the ordinary degree being 86.

CONTAGION.

The opinion of the profession does not seem perfectly settled as to the contagious or non-contagious character of Yellow Fever. Dr. Gregory is very positive upon the subject, and expresses himself in the strongest terms, saying that "no reasonable doubt can surely be entertained, by any candid, intelligent, unbiassed man, that this disease, being once received into a town, is contagious." And Dr. Stephens maintains that "the disease is at all times essentially and absolutely the result of contagion." But Dr. Elliotson takes a neutral course, and says, "I believe that the greatest authorities in America are satisfied, that the Yellow Fever is, for the most part, not contagious; but that it is sometimes contagious, appears very certain." And this matter is agitated, and its contagious character insisted upon, by Dr. M'William, of the British navy, in a recent report made to the House of Commons, upon the fever at Boâ Vista, one of the Cape de Verde Islands; but it is observable that this report alludes to a condition of country at Boâ Vista, capable of exciting the disease, without taking the fact into consideration. And it uses a still stronger argument against itself, in regard to the contagious character of the disease; for it states, that there could only be found five well authenticated cases, where natives had suffered a second time from the fever. Thus showing that Yellow Fever is no new or accidental disease at Boâ Vista. And in this, as in many previous instances, the idea of contagion is promulgated from the mere coincidence of a ship's arrival at port, with the appearance of the disease at said place.

Having seen so many persons exposed upon repeated

occasions, within the undoubted distance of contagion or infection, without contracting the disease. That it appears to me impossible to have been the case, if there had been either of these properties existing. Humanity even demands that the idea of contagion should be eschewed by the profession in every epidemic disorder, unless it be so beyond the shadow of a doubt; since it calls forth the worst features of the human heart in its ungovernable terror, and causes even the mother to desert her dying child, and the sick to languish uncared for and shunned.

Certainly, there seems to be no reasonable ground for the belief of contagion in this disease. How is it possible to maintain it, after the dangerous experiments of Dr. Firth, of Philadelphia, upon himself? as tasting black vomit, and inoculation with it, and the serum and saliva of patients with this fever. I have, myself, slept for a considerable time, on repeated occasions, (for want of better quarters,) under the same roof and in immediate contiguity with patients labouring under every stage of the disease, from the first day of the attack, to the last hour of existence. I have also cut myself with a scalpel, when handling black vomit, and the other fluids and tissues of patients who died of yellow fever; and still suffered not the least inconvenience from this contact and exposure. And I do not believe the exhalations from the bodies of those affected, have the least effect in reproducing the disease. Doubtless, the vitiation of the air by means of these effluvia, is a strongly predisposing cause, in the same degree that an impure atmosphere from any other cause would be, and certainly is.

It would not be possible, I think, to create the disease

in a person confined with and waiting upon any number of those having it, provided they were removed from the district where the disease was contracted, to a position known to be free from its invasion, and attended by one who had not been exposed to the disorder, otherwise than by contact with those affected by it. Indeed, I have seen this state of things, and under it never saw the disease contracted. Thus, at Indian Key, Florida, where the Naval hospital was situated in the epidemic of 1841 and '42; patients were brought in every stage of the disease, and even the bodies of those who had died of it at other places; yet there was not an individual case occurred upon the island.

PREDISPOSING CAUSES.

The predisposing causes are numerous. Any thing that disturbs the healthy and regular action of the system, predisposes to the disease, particularly exposure to the heat of the sun at mid-day, and the dews at night. Excess in eating and drinking, particularly the latter; a debauch in drinking is almost certain to lay open the system to the approach of the disease, since it carries in its train many other imprudences, equally dangerous with itself, such as great exposure to the sun and cool, damp, night air.

Breathing impure air: thus an atmosphere laden with particles of putrid animal or other vitiating matter, is highly predisposing to the fever, from their deleterious effect upon the general health of the system. Constipation of the bowels is a very great predisposing cause, and therefore much attention should be paid to keep them in regular and healthy action. Fear, or great dis-

turbance of the nervous system, from any cause. And it is probable that the disease may lie dormant in the system for many days.

SYMPTOMS.

The premonitory symptoms of yellow fever are felt 24 or 48 hours before its undoubted invasion. They consist in a giddy indescribable sensation of the head, with constipation of the bowels, and slight aching of the limbs. At the termination of this period, the disease manifests itself suddenly.

In some cases the onset of the disease resembles hysterics, from the agitated condition of the nervous system. In others, the person is suddenly deprived of consciousness, and falls to the ground as if felled by the blow of a mace. These degrees of violence are unusual, although they occasionally occur. Yet they never complicate the disease; passing off in a few hours, leaving the patient in the same condition as those more moderately shaken by it. These are the exceptions to the general rule.

The almost universal approach of the disease is indicated by sudden sickness of the stomach, with vomiting; violent pain in the head, back parts of lower extremities, knee joints; and often severe pain down the anterior part of the leg. And there is a creeping sensation down the spine, with rigor. The countenance is flushed and swollen. The eyes are prominent and injected with blood; having a peculiar glassy appearance, and heavy, anxious, stupid expression; which when once seen, can never be forgotten. The tongue is moist and covered with a white fur, with tip and edges pinkish. Bowels

constipated; pulse small, sometimes barely perceptible, and skin cool.

These symptoms continue six or eight hours; the patient still continues to feel a sensation of coldness, and wrapped in blankets, even after the skin, to the touch of another, is quite warm.

To these symptoms of the cold stage, succeed burning heat of the skin; violent pain in small of back, with aggravation of all the other symptoms; a slight pain upon pressure over the stomach and right hypochondrium,—the vomiting continues from time to time, though never very severe or causing much pain. The matter ejected at first is the ordinary contents of the stomach. Articles are sometimes thrown from the stomach in almost an unaltered condition, which had been taken 24 hours previously; and these cases are almost always severe; showing the deranged powers of digestion at this time. After a few hours, the matter vomited becomes smaller in quantity; green and bitter; consisting almost of pure bile. The tongue gradually becomes covered with a yellow fur; the tip and edges growing red.—A severe throbbing pain shoots across the temples, with strong pulsations of the temporal arteries. The pain in small of back increases, and is generally more persistent and severe than the pain of head. There is very little pain in the epigastrium and region of the liver. There is loss of appetite, with constipation and diminished quantity of urine, which is of dark colour. Although occasionally this secretion is found in preternaturally large quantity, and of light colour. The alvine evacuations are sometimes found to be rather frequent, but not often so. There is restlessness with loss of sleep. The skin is very hot,

dry and flushed. The pulse is small and frequent, but not quick; being generally from 80 to 90 pulsations in the minute; it is mostly a masked pulse; one though not strong, yet indicating strength, that is to say, a pulse which conveys the impression to the touch and mind, of being restrained; not having the power of developing itself in its full force; and generally increases in force, whilst the blood is flowing from the use of the lancet. Often it is observed to be full, strong, and bounding, with great force, but without frequency.

At this time insatiable thirst comes on, and this symptom continues throughout the disease, and gives more annoyance to the patient than all the others.

There is very little loss of strength experienced by those affected with this fever. So little is it felt, that one of the greatest troubles in managing these cases, is to keep the patients quiet in bed. They have a constant disposition to move about, and tell you they feel "very well," as if nothing were the matter with them. This often occurs in some of the most fatal and intractable cases, and of course much harm is frequently done by this unfortunate feature of the disease. Therefore the "walking cases of fever," as they are called, are not unfrequent. Notwithstanding this moving about, the disease is not altered or interrupted in its course, but proceeds regularly step by step, and occasions dissolution generally upon a certain day.

This feature of the disease, I suspect, has often given rise to the belief that patients have died of yellow fever, after twenty-four or forty-eight hours' illness, because they were seen at this period for the first time, or had not been longer confined to their beds. There was such a

case occurred in the Hospital at Salmadina: James E. Ringrose, marine, was brought in from the U. S. store-ship *Fredonia*, and died twenty-four hours after, with black vomit. This man was said not to have been sick before he was sent to the hospital; but upon examining the sergeant who had charge of the marines, he informed me the man had been taken sick six days previously, he did not want to go to the hospital, and said he was not too sick to do his duty, and he allowed him to do it as well as he could without reporting him sick, as the duty was light, and only came once in three or four days.

Doctor Bates of the U. S. steamer *Vixen*, was another case of the kind, who came to the hospital in the last stages of the disease, and died in about fifty-six hours after, with black vomit. But the doctor informed me, that he had been sick for more than four days previously. As his symptoms were mild, he thought very little treatment would suffice to restore him to vigour; and being opposed to active treatment in the disease, continued moving about, and did not send for aid until it was too late. Yet this restlessness and consequent neglect, often renders a case fatal that would otherwise be susceptible of cure.

During the first twenty-four hours of the hot stage, there is often a well-marked remission in the fever. The skin becomes cooler and pulse more natural, with an abatement of all the symptoms; and it is not unusual to have the skin even moist with perspiration. Yet the remission is of very short duration, when all the symptoms return with their original force. And thus the disease continues in its course without remission for about 96 hours, or

until the commencement of the fifth day, when a rapid change occurs. Now the tongue and lips are becoming dry, and covered with a dark crust, particularly the centre of the tongue, its tip and edges looking like raw-beef. The vomiting becomes more frequent, but without much effort; the matter ejected assuming a glary mucous appearance, with an occasional dark shred or spot mixed with it. The sclerotica has a yellowish hue, and the skin begins to take the same shade. The bowels are moved occasionally, the dejections being dark-coloured and liquid, passed in some cases very often. The mind at this time begins to give way; the patient comprehends slowly, and looks at you with a bewildered expression before he gives an answer.

By the sixth day, (sometimes commencing on the fifth,) there is coma, from which the patient is roused with a wild stare; the mind totters thus until it is entirely lost towards the close of the sixth or beginning of the seventh day, when there is an occasional vomiting of dark brown or blackish matter, in a glary mucus, and which has been very correctly likened to coffee-grounds, to which it bears a striking resemblance. This vomiting of black matter continues until death: it is ejected without difficulty, and frequently in large quantity; its appearance always alarms the patient, if he be conscious, and for the first time during his illness, he begins to think himself in danger.

There is frequently, from the fifth to the seventh day, hiccough; bleeding from the gums and mucous membrane of the mouth, which dries upon the lips and tongue; continence of urine, from atony of the bladder.

Towards the close of the seventh day, there is deep

coma and low muttering; the patient becomes restless, and frequently throws himself about. The surface of the body and albuginea assume a decidedly yellow colour. The features are contracted or pinched up. Occasionally there is most violent convulsion: but generally it does not pass beyond mere restlessness; still I have seen convulsions so strong during the last hours of existence, that four stout men have been scarcely able to keep the dying man upon his bed: and the patient dies almost universally on the seventh day: yet in some instances it occurs at a later period.

This is the regular march of the disease to its earliest termination, where death by the fever is not anticipated by any accidental condition of the system, such as disease of the heart, large arteries, or strong predisposition to apoplexy. This last mentioned condition is a frequent cause of death upon the third or fourth day.

I found, in three cases, large clots of coagulated blood resting upon the superior surface of the brain, beneath the dura mater. In two cases a large amount of bloody serum was found in the ventricles of the brain, at its base, and in the spinal canal, with astonishing congestion and distention of all the blood vessels of these parts, both upon the surface and within the substance of the brain. These patients died upon the fourth day, with stertorous breathing, and all the signs of apoplexy, which was evidently induced by the powerfully exciting action of yellow fever, upon an apoplectic diathesis. But where these accidental circumstances do not interrupt the regular progress of the disease, death occurs, as heretofore stated, on the seventh day, and after the manner already described.

There are several symptoms which indicate great danger, and when observed, should excite the deepest solicitude on the part of the physician, since the life of the patient will frequently depend upon the skill exercised in the management of the case at this critical period. The unfavourable symptoms are coma; bleeding from the gums and mucous membrane of the mouth; frequent alvine discharges of dark liquid character; vomiting glary mucus-looking matter.

The highly dangerous symptoms are, a collapsed expression of countenance, and sharp pinched appearance of the features; retention of urine; increasing yellowness of albuginea; vomiting glary matter, with dark-coloured spots and shreds intermixed, or positive black vomit. Hiccough is unquestionably one of the most dangerous symptoms of the disease. It frequently makes its appearance as early as the fourth day, but generally on the fifth; and it is remarkable that it is observed often at a time when the patient appears to be convalescent; and the most skilful physician, inexperienced in this disease, would pronounce him out of danger, and doing as well as could be expected. But this symptom alone conveys to the mind of the experienced in the disease the most anxious solicitude and forebodings of approaching evil, notwithstanding the other favourable appearances. He therefore redoubles his attention to the case, past experience having taught him that few recover after its occurrence. This delusive pause, which appears sometimes even without this symptom, is a very remarkable feature in the disease; for at this time, (about the fifth day,) there is frequently a perfect cessation of all pain and anxiety; the skin and pulse seem quite natural, and the pa-

tient is full of hope and in good spirits, thinking himself entirely out of danger, and seems to imagine his medical attendant is confining him to his bed unnecessarily; he vomits occasionally a glary mucus or pale greasy-looking matter, and may have hiccough; but these he accounts for in the most natural manner, from something he has drunk or eaten, and tries to persuade you he is quite well again; and so any one would think who was unacquainted with the disease. But to the mind of the intelligent physician, initiated in the mysteries of the fever, this apparently happy, but delusive respite from all pain and inconvenience, when accompanied with this symptom of hiccough, creates almost hopeless anxiety.

I have never seen a case recover, where undoubted hiccough had regularly set in; notwithstanding, I have often observed it make its appearance when the patient was perfectly easy, and his condition in every other aspect seeming favourable.

Nor have I ever seen a case recover, after positive black vomit had been thrown from the stomach, but have on some occasions heard of such cases, and always, upon tracing them out carefully, have found that instead of positive black vomit, from which they had recovered, that it appeared like black vomit, but was nothing more than the black or dark brown fur, which often coats the tongue and lips: and in other cases consisted of the dried blood which had oozed from the mucous membrane of the mouth, and thus gave rise to the report of black vomit; thus, after striving to see a case of recovery from black vomit, I have always been disappointed, and as yet out of hundreds of cases, have never seen one. I therefore conclude they are at least extremely

rare, and must admit that I have no hope of recovery after its appearance. This deceptive hope and apparent gleam of sunshine in these fatal cases, arises doubtless from the complete mortification of the mucous membrane of the stomach.

It is frequently the case, that the onset of the disease is of so mild a character, that the subject of it continues walking about for five or six days, thinking himself not very ill, and even refusing to consult a physician until black vomit appears, and he dies on the seventh day; not being upon his back probably more than twenty-four hours; indeed, some of the most intractable and fatal cases are those of which the early symptoms are the mildest, and apparently inconsiderable; so that the violence of the invading approach of the disease is no indication of its danger, or its liability to proceed to a fatal issue. Therefore it is necessary to be on the watch for, and fully aware of this insidious form of the disease.

The fever has now been described as it runs an unbroken course, observed from its first onset until its final termination on the seventh day. Yet there are some cases that do not terminate fatally for ten days, two weeks or more: these cases are probably seen for the first time, after the disease has had almost uninterrupted sway for five or even seven days. The patient at this time is unable to give any account of his case; he is comatose; with skin and albuginea of a yellow tinge; tongue and lips incrustated with a dark brown fur; the tip and edges of tongue looking like raw beef; bleeding of the gums; great thirst; pulse frequent, weak and small; bowels constipated or frequently moved, the dejections being dark-coloured; urine dark and in

small quantity ; there is frequently retention of it. The skin in these cases is yellowish and dry, with burning heat, and is sometimes studded with petechiæ. The matter ejected from the stomach either has a pale glary or greasy appearance, or may be positively black vomit.

These cases linger sometimes for many days, or even weeks or months, and die eventually of softening of the brain, spinal marrow, liver, and intestinal mucous membrane; or by proper and judicious management, may sometimes recover. This may be called a second view of the disease, or presenting it under a new aspect.

We have now but two points left in the consideration of this disease, yet these are of the greatest possible importance; they are its Pathology and Treatment, both of which it is indispensable to fully comprehend, after recognising the disease through the medium of the manifested symptoms. And as the treatment is based upon its pathology and cannot be perfectly comprehended, or its adaptability fully appreciated, until the mind has a clear, fixed, and positive knowledge of the latter, I shall therefore take it up first, as being properly next in order, and examine the subject fully, to see what organs come within the boundaries of its destructive influence, and what the nature and extent of the changes created by this diseased action.

PATHOLOGY.

Here I am forced to differ with some very high authorities, but as I have no hypothesis to support, and intend merely to describe what nature and disease present

to observation, I cannot be responsible for the discrepancy, since nature never errs; but books, being subject occasionally to exceptions (like the best of rules,) sometimes do; and without further prelude I will pass to the examination of the pathology of the yellow fever, as found in cases running a regular course and terminating in death on the seventh day; examined six, twelve, eighteen, and twenty-four hours after death.

The exterior surface of the body which at the hour of death is yellowish, darkens in a few hours after into a deep dirty orange or lemon colour, about the neck, side face and genital organs, assuming the peculiar ecchymosed appearance of persons poisoned by arsenic; the sclerotica is equally yellow with the skin; and there is very little odour arising from the body.

The brain and its membranes show in all cases results of active and extensive disease. The substance of the brain is rather firmer than natural, and completely engorged with blood, both upon its surface and interior structure: the ventricles are generally filled with a yellowish or bloody serum, although in some cases they are preternaturally dry; yet the amount of bloody serum contained within the cranium generally is very large. The substance of the brain is so fully charged with blood, that when the medullary matter is cut across, numerous points bleed freely; and its whole structure is so coloured by the amount of blood contained in it, that there is but little difference existing between the medullary and cineritious matter.

The membranes of the brain are all thickened; the dura-mater particularly so in the region of the superior longitudinal sinus; and the glands of Pacchioni are very

much enlarged. The arachnoid membrane is greatly thickened, of a pearly hue and tears with difficulty, compared with its delicate normal condition.

The pia-mater is thick and whitish, like the arachnoid, to which it is firmly adherent; there is often a quantity of partially organized lymph thrown out upon the surfaces of these two membranes, sometimes an eighth of an inch in thickness, and I have even seen it nearly a quarter of an inch thick; having found these two coverings so thickened and strengthened by the process of inflammation, that I have held suspended the whole mass of the brain, engorged as it is, and with the dura-mater attached, by these two delicate membranes, that in their natural condition break at the slightest touch.

The alterations of the spinal marrow and its membranes are the same as those found in the interior of the cranium. The vessels of the membranes of the brain and spinal marrow are greatly distended with blood.

The heart and lungs are not at all affected in yellow fever. But very important changes occur in some of the abdominal viscera: as the stomach and liver.

The stomach is filled with or contains a large quantity of black vomit; its mucous membrane is thickened to twice its healthy condition; it is dark-coloured, softened, and in a state of sphacelus, and frequently removed in large patches, particularly about the cardiac orifice, where I have seen a surface as large as the hand, entirely bare of this membrane. But generally it is removed in smaller patches. And throughout the rest of its surface, it is so soft that it is easily removed by the handle of a scalpel, or the finger-nail, and it is also about this orifice and smaller curvature, greatly injected

with blood. Throughout its surface, are small bright scarlet spots, looking so much like a fresh drop of blood, that I have seen the finger of those unaccustomed to these examinations, passed over them, thinking to brush these stains away. But they are fixed in the mucous membrane. This condition extends to the pyloric orifice, but here it stops; from this out, the intestines both large and small are unaltered and natural, with the exception of a slight degree of congestion or injection of the mucous membrane of the duodenum: the whole of this membrane is in its normal condition.

The liver undergoes a very great change. It is rather contracted, and of a yellow colour, resembling very much the colour of old box-wood: this is particularly observable on the anterior part of the right lobe; although it pervades more or less its whole structure.

Its substance is very much firmer than natural; indeed it is almost of a cartilaginous consistence: so much so, that it is nearly impossible to penetrate a piece of it with all the force one can exert, when holding it between the fingers and thumb. It cuts with a hard shining surface, and tears rather smoothly; its normal or granular appearance being almost or entirely gone. It is probable that its eliminating or secreting power is entirely lost, which accounts for the large amount of bile colouring the tissues and the serum of the blood.

The gall bladder is natural, and contains a moderate quantity of dark bile. The spleen is unaltered, except in cases where the deceased had suffered from frequent attacks of intermittent fever: in these cases it was enlarged and softened. No other alterations are observed in the abdomen.

Thus we find in every pure case of yellow fever, the following organs affected, and none others; and these always and in every case, presenting precisely the pathological changes already described; namely, great congestion and hardening of the brain and spinal marrow; with thickening of their membranes: congestion, softening and sphacelus of the mucous membrane of the stomach, with the removal or loss of part of its surface: and contraction and almost cartilaginous hardness of the liver.

These comprise all the changes effected by a fatal attack of the yellow fever terminating upon the seventh day.

In the second case, wherein the disease comes to a fatal issue upon the fourteenth day or at a later period, very different pathological appearances present themselves. In these cases, the brain and spinal marrow are softened; their membranes are thickened, and there is generally a very large amount of yellowish or bloody serum within the cranium and spinal canal. The heart and lungs are healthy. The stomach is in much the same condition as already described. But the mucous membrane of the duodenum, small and large intestines, is greatly injected, thickened, and softened; of very dark colour, and in some cases removed or destroyed in patches. The glands of Peyer and Brunner are injected and enlarged. The whole tract of the mucous membrane resembling the change of structure met with in patients dying of typhus fever, but not to the same extent. The stomach is sometimes filled with black vomit, and the intestines contain dark matter resembling it. The mucous membrane of the bladder is injected with blood, and

spotted with many scarlet puncta. The spleen, if altered at all, is rather softer than natural; but in cases where the subject had laboured under intermittent fever of long standing, it was invariably of large size and very soft. The liver is engorged with dark blood; about natural size, of dark colour and softened. Thus showing at this advanced or protracted stage of the disease, a complete breaking down of the structure of the brain, spinal marrow, liver, and mucous coat of the stomach and intestines. The skin upon the thighs, arms, abdomen and breast, is often covered with petechiæ. The albuginea and the whole surface of the body is much darker in colour than those dying at an earlier period. This is observable even before death takes place. The lips, tongue and gums are covered with a dry brown crust, the tip and edges of tongue red, and almost or quite raw. There is little or no emaciation of body. And I have never seen in any case, the least reason to suspect any change in the dimensions either of the stomach or intestines. The kidneys and other viscera are found to be in normal condition. The blood remains in its liquid state in those who die; but there does not appear to be any peculiarity in that taken from yellow fever patients. It is observed to be cupped, has the buffy coat and same appearances as all blood taken from those suffering by active inflammation and a high state of fever. It contains, doubtless, a large amount of bile or its constituents, owing to the crippled or suspended functions of the liver.

Black vomit is of a dark brown colour generally, but is sometimes nearly black; I have seen it occasionally the colour of tannate of iron: it exists in shreds or floculi, floating in a greasy or glary looking fluid, some-

times pale, but generally dark-coloured, and the shreds or flocculi appear frequently like portions of the mucous membrane of the stomach, stained by the altered condition of the blood, in its substance; many of these adhere to the sides of the vessel into which they are thrown. The composition of black vomit has been variously stated to be, either an altered secretion of the stomach, or vitiated bile meeting with peculiar substances in this organ, and thus giving rise to this pathognomonic substance. But its true composition, beyond all reasonable doubt, is pure blood mixed or combined with hydrochloric, or acetic acid; physiological research having discovered these acids existing in the stomach in a free state. It cannot be bile, since it exists in such large quantity. The amount of bile found in the gall-bladder is very small, and none at all found in the stomach or intestines; whilst the liver is not in a condition to secrete it in large quantity, if at all. Now where does the large amount thrown off from the stomach during life, and found in this organ after death, (amounting sometimes to pints,) come from? From the blood, most certainly. And it is easily accounted for. The mucous membrane of the stomach is softened and broken down; and this membrane, than which there is none in the system more plentifully supplied with blood vessels, indicates a strong predisposition to the exudation of blood, as observed in the throat, and that lining the mouth and gums; which at this time (about the fifth day,) bleed profusely, by transudation throughout its surface. And of course the amount of blood transuding through the soft, broken down structure of this membrane lining the stomach, must be very great. It collects in the stomach, where it meets

with free muriatic acid; and the combination of these two liquids, forms this peculiar black matter. A substance can be made, by the admixture of diluted venous blood with muriatic acid, so like that ejected from the stomachs of those who have died of yellow fever, that I defy the most experienced eye to detect the difference. Indeed it cannot be done; and I have produced specimens of them side by side, to those in the habit daily of seeing black vomit, and never knew any one who could tell the fabricated from the real, from the fact that they are precisely the same.

Thus after careful consideration of the manifestations of this disease, together with the pathological alterations observed in it, I am fully of opinion that the immediate or most active cause of death, must be looked for in its effects upon the brain; since the diseased condition of the liver and stomach would not destroy life in so short a time, although they certainly assist the brain and its appendages very much, in hastening its final conclusion.

It may seem presumptuous, still I must confess I cannot comprehend Monsieur Louis' account of the pathological appearances discovered in the fatal cases of yellow fever at Gibraltar in 1828; for he admits he is entirely at a loss to account for the death, and shows at the same time, that he never inquired into the condition of the brain and spinal marrow, but passes them by without a word, and even without observation. Nor, indeed, can I understand what he observes in regard to the altered dimensions of the stomach and intestines.

Thus the pathology given by Monseieur Louis is as follows:

“The stomach was larger than natural in seven sub-

jects, smaller than usual in three. It contained a clear, or dark red-coloured liquid, a blackish, or perfectly black fluid in different quantities, in three-quarters of the cases. Its mucous membrane was red, through a greater or less extent, in six cases; rose-coloured or orange in eight cases; grayish, yellowish or whitish in others. It was thickened through a greater or less extent of surface in half the cases; softened and yellow to an extreme degree in the same number; at the same time, thickened, softened and red in a third part of the cases; mammillated in two-thirds; ulcerated in two cases; it was natural in five cases. The mucous membrane of the duodenum was red in a little more than half the cases; softened in the same number, and thickened in one case. The small intestines contained a greater or less quantity of reddish, brownish, blackish, or perfectly black matter, in two-thirds of the cases. Its mucous membrane was slightly injected or red, in spaces, in a little less than half the cases. Its consistence was more or less diminished through its whole length, or through a part of its extent only, in rather a greater number of cases. It was partially thickened in one case; in no case was it ulcerated; and Peyer's glands were always natural. The large intestine was of a greater size than usual, in two cases. In fifteen cases it contained a matter of a wine-lees colour, or blackish, or brownish, or chocolate-coloured, or entirely black. Its mucous membrane was of a pale, or bright red colour in five cases; grayish, yellowish, or whitish in the others. Its consistence was more or less diminished in three-quarters of the subjects. Its thickness was increased in three cases; and twice we found it slightly ulcerated. The mesenteric glands presented

traces of inflammation in four cases; the cervical glands in one case; in another case one of the glands above the biliary ducts was red, softened and very large. The liver was of greater size than natural in two cases; a little firmer than usual in three cases; a little less firm in three others. Its cohesion was increased in six cases, diminished in seven. Its colour was altered in every case; sometimes it was the colour of fresh butter, sometimes of a straw yellow, a clear coffee and milk colour, sometimes a gum yellow, sometimes of an orange colour. The spleen was softened in eight cases, and to a moderate degree, with one exception. It was larger than usual in five cases. The lesions which we have thus placed before the reader, were rarely considerable, very often insufficient to explain the death, and when this explanation was afforded, it was by a combination of several lesions. These lesions may be divided into two classes, some of them peculiar or almost exclusively peculiar to subjects dying of yellow fever; others common to those subjects, and to subjects who have died of other acute diseases. The red or black matter found in the alimentary canal, and the remarkable alteration of the liver, are of the first class, all the other lesions of the second. The red or black matter of the stomach or intestines not having been found in all the cases of yellow fever, it cannot be considered an anatomical character of the disease. But it is not so with alteration of the liver, which was more or less exactly the same in all the cases, and which, for that reason, ought to be considered as the essential anatomical character of the yellow-fever of Gibraltar of 1828."

"Amongst the lesions of the second class, the yellowness and the inflammation of the mucous membrane

of the stomach should be especially remarked, as well from their frequency, as on account of the rapidity with which they come on. The inflammation of the mucous membrane of the stomach not having taken place in all the cases, and Peyer's glands not having ceased to be natural, it follows, on the one hand, that the yellow fever of Gibraltar of 1828, is not a gastritis, and on the other hand, that it is not a typhoid fever. This last conclusion is even more strict; for not only was there an absence of the lesions of typhoid fever in the bodies of the victims of yellow fever, but these bodies presented other lesions which are not found in the victims of the first disease, and which are peculiar to the second disorder."

"What, then, is the nature of the yellow-fever of Gibraltar of 1828, and where is the seat of it? If it be neither a gastritis nor a typhoid fever, neither is it a hemorrhage, as it has lately been said to be; for the hemorrhage did not take place in all cases. Is it a disease of the liver? Undoubtedly the liver was the organ principally and essentially affected: still we cannot regard the yellow fever as simply a disease of the liver, because its lesion, at least in the present condition of science, does not explain the febrile symptoms in the cases where this was the only lesion; and in the second place, because it is entirely insufficient to explain the death."

"As, then, a strict analysis of the anatomical appearances of the yellow-fever of Gibraltar, of 1828, proves the existence of a cause unequal in its operation, and of which but one effect is constant, the specific alteration of the liver, and as in a third part of the cases it is directly to this cause that we are obliged to refer

the death, we naturally ask how does this act, through the medium of what system does it exert its influence on the economy? Is it through the nervous system, is it through the blood, in which, however, we have not detected any special modifications?"

Does Mons. Louis wish us to infer that the muscular and cellular coats of the stomach are affected in this disease or not? For certainly the mere softening and thickening of the mucus membrane as he describes it, could not increase the dimensions of the stomach, nor would it decrease it. Still he does not mention a word about any altered condition of the cellular or muscular coats, without which it would be impossible to have its capacity materially affected, and as for judging of slight variations in the size of this organ, every anatomist knows it is impossible; for the natural dimensions of the organ in different individuals, is almost as various as the number examined; being capable in its normal condition of containing in some cases about a pint, whilst in other cases it will contain several.

TREATMENT.

Having now carefully examined all the organs and parts of the system altered by this diseased action, as well as the nature and extent of these alterations, we come directly and naturally to the consideration of its proper mode of management or treatment. And this becomes self-evident, when we look at the symptoms and the altered structures. It seems impossible that there could exist but one opinion upon the subject; it is as clear as the noon-day sun.

In the former, we discover great disturbance of the

nervous centres, producing effects similar to hysterics, or causing a lifeless fall to the ground, or a feeling of phrenzy. Great heat of skin; tenderness upon pressure over the stomach and liver; great thirst and ejection of every thing swallowed; violent throbbing pain in head and back, with sleeplessness, cramps in extremities, coma and convulsions. These, taken in connexion with post-mortem evidence, are sufficient to convince any one of the existence of the most violent inflammatory action going on in the substance and membranes of the brain and spinal marrow. And the condition of the liver and stomach, produce arguments to this effect, not to be mistaken nor misunderstood.

What then is the system of treatment demanded to counteract a diseased action, which thickens delicate and important membranes by the deposite of coagulable lymph upon their surfaces, thereby destroying their functions; and at the same time altering the structures of such indispensable organs as the brain, spinal marrow and liver; and by its rapid and destructive inflammation, causing the death of the mucous membrane of the stomach in a few days?

Can there be but one proper mode of managing such a disease? Certainly not. And that mode consists in the active employment of the means best calculated to allay nervous erethism; to arrest a destructive flow of blood upon, or sanguineous congestion of important organs; to prevent the secretion and deposit of coagulable lymph upon certain membranes, and to reduce the force and inflammatory power of the general system. These indications should be promptly and forcibly met by the best means in our power, for the expectant practice in this

disease either destroys the health of the patient for ever, or is certain death, as it is in every active, violent disease of highly inflammatory character.

Now, what are the means best calculated to effect the objects desired? I know of none so likely to respond to our desires as the lancet, calomel, opium, or its preparations, counter-irritants, saline purgatives, and stimulating enemata.

The action of the first reduces the general strength as much in ten minutes as one month's starvation by diet would do: and it not only arrests the force of the general circulation, but reduces at once the whole system, operating as forcibly upon the excited condition of the nervous as the sanguineous system, and is, therefore, indispensably necessary. The second action most desirable to bring about, is that of mercury, which acts favourably in all its many important influences. Its sedative property tends to allay the excited condition of the system, and its purgative to reduce its force; but above all is it useful in this disease by the invaluable property it possesses of arresting the deposit of coagulable lymph in the tissues, and even correcting a disposition to this by the reduction of inflammatory action, and, therefore, the direct and important bearing of this remedy upon the disease must be evident to every mind. Counter-irritation is exceedingly useful in setting up an antagonizing action by artificial means in a sound structure that can easily be allayed, but serving for the time to attract the circulation and existing irritation and diseased action going on in important organs. This indication is best subserved by means of blisters, sinapisms, and stimulating enemata, which last, are some of the best means of

relieving the brain. Opium and its preparations serve a good end in allaying nervous erethism during the stage of excitement. Thus, instead of acting as a narcotic or stimulant, when properly managed, it has a very beneficial sedative effect upon the nervous system, and by this action assists the other means employed for allaying irritation or abnormal action, and at the same time, relieves materially the sanguineous congestion of the brain, spinal-marrow, and probably other organs. Who can doubt for a moment that nervous excitement causes an increased flow of blood to a part? A very familiar and convincing example of this action is observed in the suffusion of the face in blushing, wherein the flow of blood to the part is doubtless caused through nervous excitement: witness also the violently increased action of the heart under sudden and strong excitement of the nervous system. Therefore, the peculiar influence of this remedy is demanded by the disturbed condition of the economy, and acts in unison with the means previously considered.

It is only in this manner, and by a sound train of reasoning, that a useful and philosophic practice can be fixed upon in any disease. And the physician who does not examine thus critically into the nature of disease and acquire a positive knowledge of the precise character of the altered action and its ravages upon the system, and then apply such remedial agents as will bear the test of a sound, deliberate criticism; walks in the dark, and trusts to fortune, and not to medical science to lead him through this mental erebus. Having examined into the curative action of the remedies employed, it is now necessary to consider their immediate application.

If the patient be seen during the cold stage of the disease, which lasts for six or eight hours, apply a large blister, covering the epigastric and right hypochondriacal regions: this soon allays vomiting. Then give one scruple of calomel with a fourth or half grain of sulphate of morphia, being governed entirely by the extent of nervous excitement. In the earliest stages of the disease an emetic of ipecacuanha or chloride of sodium with warm water may be given, and I have occasionally employed it with advantage, but not as a general rule: still there can be no objection to the practice, since the nausea and vomiting are frequently more easily allayed after it, and it has a tendency to increase the circulation upon the surface of the body.

As soon as the fever or stage of febrile excitement is fully established, strike boldly with the lancet; for this is the sheet anchor of our hopes of cure in this disease. Bleed *ad deliquium animi*—the amount of blood should not be regarded in the least: let it flow until the fever breaks, and the skin upon the forehead becomes moist. This is a golden rule, and when properly followed, leads almost certainly to a cure. I, therefore, bleed largely, and even close the vein between my fingers when the patient is getting faint, (which is often the case after the loss of but few ounces of blood) and give a mouthful of cold water—this passes off in a few moments, the head still throbbing, and skin hot and dry. Then let the vein spring, and the loss of a very large amount of blood is borne, until after a time all pain leaves the head, back, and limbs. The skin becomes moist, the arm is bound up, and the patient enjoys a refreshing sleep, the first generally for forty-eight hours. The calomel is followed six or eight hours after by an ounce of sulphate of mag-

nesia, which generally succeeds in opening the bowels freely; if not, it should be repeated. Dress the blister with mercurial ointment, in order to bring the system under the influence of mercury, and a mild degree of ptyalism should be continued for about seventy-two hours from the commencement of the attack, during which time not a mouthful of any thing should be taken into the stomach unless the vomiting continue. In this case, from a quarter to half a drop of creasote dissolved in ether or acetic acid should be given every hour until it ceases, combining it with very small doses of morphia, if the excitement of the nervous system require it, but not without.

If the bowels be not opened daily, they should be injected with an enema of castor oil two ounces, turpentine four ounces, and sufficient gum water or other vehicle to fill well the large intestine. This enema should be given once or twice a day; in cases where the vomiting continues, and there is the least approach to dulness of the intellect or coma.

Iced water should be kept constantly applied to the head, and ice or iced water kept in the mouth to allay thirst, but should not be swallowed; for it is all important to keep the stomach perfectly quiescent. Where the skin becomes hot and dry, it should be sponged with cold water. Sinapisms or some other irritant should be applied along the spine to relieve the pain in the small of the back, which is the most severe and persistent the patient feels.

It is sometimes the case that after the lapse of twenty-four or forty-eight hours or more, the skin becomes hot and dry, violent pain in small of back, with throbbing

pain in the head and disposition to coma. Where this is the case, bleed again. I am satisfied in my own mind that I have saved life by bleeding a second time in those cases where there was a return of the febrile symptoms. Although this necessity does not arise in more than one case in two hundred, or at least in one hundred; yet where it does appear, it is important not to neglect it. When this system of treatment is carried out rigorously, the patient generally, on the fourth day, but almost universally on the fifth, is free from all fever, and has not a bad symptom left, and desires something to eat; and if he be moderately indulged with a little gruel of tapioca or some such innocent diet, sweetened, spiced, and seasoned with wine, he will improve very rapidly: at the same time, that is, from the fourth or fifth day, he should be allowed to drink weak brandy and water—this is one of the best stimulants that can be employed—but he should be stimulated gradually: and from this time no other medicine will be required than small doses of extract of colocynth or taraxicum and blue mass. Where the nervous system is much disturbed, small doses of strychnia can be added with advantage, followed occasionally by a Seidlitz powder, merely sufficient to correct the tendency to constipation which exists for some time during recovery.

After the seventh day the convalescent can begin to walk about, yet recovery is very slow; and if the patient remain in the region of the fever, he is very liable to a second or third attack: indeed if he be kept in the district of country where the fever was contracted, he is more liable to a subsequent attack from the debility he is then labouring under, than he was originally.

In the past summer in the gulf of Mexico, I saw more than two hundred such cases.

I am fully aware of the great weight of authority against this view of the subject, and whilst I speak with all deference, yet modesty should never have the effect of hiding truth; and I am therefore compelled to give facts as they occurred, confident they can injure no one, and often have the good effect of preventing exceptions being established as the rule. In making the above statement, I am not governed by hear-say evidence, but positively by my own observation: these men I treated myself, in both attacks of the fever; saw them convalesce, as well as they could, whilst kept in the same climate, and exposed to the exciting cause of the disease; watched them in the performance of their duties, for days, weeks, and even months; and then witnessed them again distinctly attacked by the fever a second time, and from which some of them died; therefore it is a matter upon which I am perfectly convinced. And from which I infer, that it would be exceedingly dangerous to advise those who are acclimated, or who have suffered previously from yellow fever, to remain within the boundaries of its influence during its epidemic reign, from the supposition that they are beyond the grasp of its power.

As regards more uncertain evidence of this fact, I can state that I have often been told by those labouring under this fever, that they had suffered from it on previous occasions; and although this is no proof, yet it is such as has been frequently taken in support of the impossibility of such an occurrence. But I can bring forward strong and positive evidence in support of the fact herein mentioned, in cases I did not witness with my

own eyes; yet are they beyond all doubt. The following is an extract from the letter of a friend, Wm. H. Allmand, Esq., secretary to Commodore Perry, whom I treated for a severe and protracted attack of yellow fever in July last, from which he recovered, and was afterwards engaged in very laborious duties, and continued free from disease for months. He now writes me to the following effect, without knowing in the least that he has touched upon a moot point; but simply states a fact, viz:—

Vera Cruz, February 19th, 1848.

“In the latter part of November, the Commodore got up an expedition for the ports to the eastward, and embarking in the ‘Mississippi,’ took also with him the ‘Scorpion and Water-witch.’ Unfortunately, however, I had not been seventy-two hours on board before I was again taken with the fever.”

It may be said this was, probably, not Yellow Fever; but, in explanation, I can state that the Mississippi rejoined the Gulf Squadron in the latter part of October, having left it in the early part of August previously, and that after her return, she lost no less than four officers with black vomit, showing that she not only had the Yellow Fever on board, but had it severely.

The following is from a friend who knows the disease as well as one out of the profession can, from having been raised where it is endemic, and has both suffered from, and seen a great deal of it. I will, therefore, give an extract from the letter of Lieut. J. R. Mitchell, U. S. Navy.

“I had an attack of yellow fever in Charleston, (S. C.) in the memorable summer of 1817, when it raged with the greatest virulence.” “I had a second attack in 1821,

in the small town of Jackson, (Alabama) where the fever prevailed as an epidemic in its worst forms. My case was for a time regarded as hopeless." "In the summer of 1822, I had another, (the third) attack in Pensacola, where the disease of a most malignant type prevailed, and I distinctly remember that this attack was quite, if not more violent than the generality of those cases which proved fatal."

The extract below, is from the letter of Dr. T. M. Potter, U. S. Navy—a gentleman who has had ample opportunities of acquiring knowledge of the disease, and his convictions from actual observation and experience upon this question are expressed in the following terms:

"U. S. Navy Hospital, near Portsmouth, March 25th, 1848."

"I can also agree with you fully in the frequent recurrence of the disease after the patients were considered sufficiently restored for duty."

Nor are previous attacks of long standing any immunity from this disease, and it is very probable that the escape which permanent residents make where this disease is endemic, arises much more from the great care they constantly take in avoiding the predisposing and exciting causes, than from any protective influence arising from acclimation. This perhaps gives them some better chance of escape, but it does not protect them from the disease. And, beyond all doubt, the cause of strangers suffering so much more, is from recklessness in disregarding the necessary avoidance of every thing that predisposes the system to the disease. Therefore, it is absolutely necessary to safety and rapid convalescence to remove the person at once to a high, or perfectly dry, healthy, and cool district of country; or if it be on ship-board, they

should stand to seaward beyond the influence of breezes from shore. The convalescent should live well, and I know of no drink during recovery from this fever equal to good porter. Exercise should be taken moderately; for muscular debility, particularly in the lower extremities, continues for a long time, and seems rather to increase than diminish during the first few weeks of convalescence. Vertigo, pain in the head, lumbar, and right hypochondriacal regions, with general debility and alternate diarrhoea and constipation last for many months, with frequent attacks of rheumatism; if the patient have suffered at all from this disease previously. Palpitation of the heart is a very common sequence of yellow fever, arising from the deranged condition of the nervous centres.

In the second case, where the patient is seen for the first time on the fifth or sixth day, great care, and good judgment are required to fix upon the proper mode of treatment. If the system will bear the use of the lancet, use it, even though but few ounces of blood be drawn, for the relief to the system is great. But there are cases where it cannot be thought of, nor even topical bleeding. Still where this can be supported, cups should be applied to nape of neck, and in the region of stomach and liver.

The general condition of these patients is found to be oppression of the system, with skin hot and dry, slightly tinged with yellow, and the sclerotica of the same hue, tongue dark brown in centre, edges and tip like raw beef, the whole mouth dry, with the gums and mucous membrane of mouth and throat occasionally bleeding. There is listlessness or coma, and frequent vomiting of glary or greasy-looking matter or black vomit, and retention of urine.

The treatment of these cases should be prompt, and

to the purpose, but mistakes should be carefully avoided in this stage of the disease, as they are dangerous. Where general or topical bleeding is admissible, it should be employed; every means should be used to bring the system at once under the effects of mercury; counter irritation should be employed by means of rapid vesication over the region of the stomach and liver, dressed with mercurial ointment. The colon should be filled with the stimulating enema already mentioned three or four times every twenty-four hours, and where the bowels are constipated, croton oil, given either in tincture or pill form, to keep them gently moved. Iced water should be applied constantly to the head, and the surface of the body sponged with cold water or an evaporating lotion. Ice may be held in the mouth, and from half a drop to a drop of creasote in solution given every hour with brandy and water.

These are invaluable remedies at this stage of the disease, for the system demands stimulation to enable it to react, and the creasote arrests vomiting, stimulates the mucous membrane, and puts a stop to, and corrects the advancing disorganization or mortification of this organ. The nitro-muriatic bath or sponging is useful in these advanced cases with great oppression of brain; or the application of sinapisms to lower extremities. But the reductive means should be changed in such cases as in the former, precisely at the right time, and the supporting or stimulative substituted.

This is a nice point, of which too few seem fully aware. Yet much of the success of treatment in all fevers depends upon it; for if one continue the reduction of the vital force of the system, the fever that he has tried in

vain to subdue, still continues, and the greater his efforts to allay this stage of fever and abnormal excitement, the more it appears to gather force, and the patient sinks under it.

But what is the real state of the case? He has proceeded too far, and has overlooked the difficult, but all-important points of sthenia and asthenia (for the philosophy and usefulness of which we are indebted to Dr. Brown,) or when to arrest his measures from the reduction of the fever, has continued them, and now has a nervous fever, or excitement set up in the system from very debility and want of stimulus. A fever and increased heat of skin and quickness of pulse, which to endeavour to subdue by depressing or depleting means involves certain destruction to the patient. Indeed, it is a bad habit which many fall into, that of excessive medication of their patients, a constant disposition to stuff them with remedies when the absence of all remedies is the only one required to restore the patient to health—a choice their medical guardians seem to deny them,—losing sight entirely of the “*vis medicatrix naturæ*,” for certainly there is as much skill and judgment required to know when not to administer medicine, as when to give it. Yet do I think nothing more admirable than bold and active treatment wherever it is required; and in yellow fever we have a disease with these requirements, a disease in which the safety of the patient demands the boldest and most prompt action, an affection wherein hesitation and weak measures are almost certain death, or worse; for who can tell the melancholy changes produced upon the important organs involved in this active and violent disease, by a weak, dilatory, and negative

course; when all is left to nature, and that nature for the time run mad, and thus allowed to tear, maltreat, and destroy itself, whilst its legitimate guardian, medicine! stands idly by with arms folded, wondering what will come next. Better far strike into the heroically antiphlogistic course herein recommended, and as I apprehend, the only true course of treatment, the result of which, in the late epidemic, which was remarkable for its fatally malignant character in many localities, as well as that of 1841 and '42, was sufficiently successful to preclude the remotest idea of a change of views or treatment, particularly after having had the advantage of observing the results of various modes of treatment in Africa in 1844 and '45, and in the West Indies in 1846, and the two epidemics heretofore mentioned.

As a few statistics may not be deemed irrelevant, I will refer to instances to be found in the official reports and journals at the Navy Department.

In the early part of the autumn of 1841, the U. S. Brig Jefferson arrived at Indian Key, Florida, having sailed from Mobile with the yellow fever on board and without a medical officer. On her passage she lost some of her crew, who died with black vomit; and on her arrival at the Key the sick were sent to the Hospital in every stage of the disease; some of them being moribund, and others who had been labouring under the disease for many days died; but I think there were none lost who had been landed within the first three days of the attack.

A few days after this, the U. S. Schooner Otsego arrived at the Key, from the west coast of Florida, which she left two days previously. On her passage, Doctor McKinley, her only medical officer, and one of the crew,

(they being the two first taken sick,) died on the seventh day of the attack, having thrown black vomit from the stomach during the latter part of the disease. These two bodies were buried, and every officer and man in her were taken to the Hospital with the fever. They all in due time recovered, not one death having occurred after leaving the vessel. It was absolutely necessary for the vessel to return to her station to relieve an expedition in canoes; and after having been perfectly cleansed, she returned to the west coast with an entire new crew, officers and men, both having volunteered for the duty: but in a short time again returned, to land all hands, down with the fever. But warned by the melancholy fate of the previous crew, the moment the disease made its appearance, she sailed and arrived two days after at Indian Key, where fortunately they all recovered. Some of the expedition which they relieved died with black vomit upon the coast, and three died at the hospital after landing, having been sick several days.

In the epidemic of last year, at the city of Tabasco, where it first appeared, we had considerably more than three hundred cases, but fortunately had not one death to report from the fever. And on board the U. States Steamer, Mississippi, during the same summer, more than four hundred cases of the fever occurred during the months of July and August, whilst I was attached to her, during which time the only deaths that occurred on board were Frederick Feihl, musician, and one seaman, the coxswain of the Commodore's barge, both of whom threw up black vomit.

After this ship left the station, the late Dr. Howard Smith and myself took charge of the naval Hospital on

the Island of Salmadina, where I think we treated over four hundred cases, and the following officers and men died of those received within the first forty-eight hours, viz: Dr. Kearney, Fleet surgeon, and Lieut. commanding Chauncey, died on the fourth day, of apoplexy, induced by the fever, to which they were predisposed; Lieutenant Chauncey having suffered previously from disease of the brain. Dr. Howard Smith died on the seventh day; and Richard Bates, master of arms, of the U. S. Steamer Scorpion, over 70 years of age, died on the seventh day, also throwing up black vomit. The following were received from the fourth to the seventh day, and died with black vomit on the seventh day: Dr. Bates, U. S. Navy; James E. Ringrose, marine, ætat. 30; Francis Muscaro, musician, ætat. 24; John Richardson, marine, ætat. 30; George Burton, marine, ætat. 55; Sergt. McDonald, marine, ætat. 57, and Sergt. Henry Aubrey, marine, ætat. 30. The two last were received on the seventh day, and died in a few hours after, and James Carrigan, marine, ætat. 28, died on the seventh day also. Francisco Guido, musician, ætat. 40, died on the fourteenth day with black vomit.

Owing to the death or sickness of nearly all the medical officers on the station, medical aid was not always at hand. Thus, the result of the treatment as applied to the disease in the several times heretofore related, was the loss of half per cent., in those received in the early stages of the attack; and in consequence I have been asked by members of the profession, if they were all really and doubtlessly cases of yellow fever? I can conscientiously say they were, beyond the least doubt. As the symptoms and march of the disease up to a certain period

were precisely the same in those who recovered as they were in those who died. Nor were the fatal cases always those from which the symptoms would most strongly and decidedly have indicated yellow fever to the minds of those who would have been stubborn skeptics, and determined to disbelieve, until black vomit and death occurred, and then yielding an unwilling consent; but on the contrary the whole march of the disease in some fatal cases, was of the mildest character: whilst many of those who recovered, were of the strongest and most marked character. What places the matter beyond doubt, is, that in almost all fatal cases, death occurred on the seventh day, accompanied with the pathognomonic black vomit, and the post mortem examinations always furnished evidence of an identical cause of death. If the fatality had been fifty per cent., I would have given it; but since it was but a half per cent., it is impossible to make it either more or less, and must be given as it occurred whether the resulting mortality be considered numerous or otherwise.

I have also been asked if those attacked were not merely ailing in most cases, or if they were really sick enough to go to bed? I will allow others who were present and observing the sick to answer this question. To explain unanswerably, that my imagination and individual impressions did not cause me to consider those absolutely sick who were merely indisposed, I therefore insert the following accounts of it by others, to show the nature of the invading approach of the disease as observed by them.

The following extracts are from the letter of Lieut. Simon F. Blunt, U. S. N., Executive Officer of the U. S. Steamer Mississippi, in the Gulf of Mexico, at the time

and place to which his description of the yellow fever on board this ship refers:

WASHINGTON, D. C., March 20, 1848.

"I am sure that if the medical gentlemen of whom you speak, could have witnessed the appalling scenes which occurred on board the Mississippi, under our observation, they would have no hesitation in pronouncing the disease that prevailed there, of the severest nature. The cases were, many of them, of the utmost vigour. Men strong of constitution and powerful of frame, were suddenly and fatally prostrated. Parker died of black vomit—Barbour—Brown—Pons, and many others whose names I do not now remember were, as plain as colour and substance could demonstrate, victims to the yellow fever—black vomit—or whatever other name characterizes the disease.

"At least three hundred others were prostrated as by a single blow, to utter helplessness and the most imminent danger. The whole crew were so far disabled, that when the determination to quit Anton Lizardo was finally taken, I could not find more than *fifteen* of the ship's crew to hoist in coal. The extent and severity of the disease for many days previous was such that all except the most necessary duties had to be suspended, in consequence of the want of men to perform them. The vomiting of the sick, who could not be removed from the ship, was so constant and extensive, that several men had to be stationed to keep the decks clear. The boats were daily sent to the hospital loaded with sick, until the entire number of souls on board amounted to not more than one seventh of the ship's complement. There was scarcely a man or officer who escaped, and I can truly say, *there was not a well human being on board the ship for many days, during this dreadful sickness.*"

The deaths by yellow fever, spoken of in the foregoing letter, occurred at the time that universal sickness of the same character, was prevailing at the City of Tabasco, heretofore mentioned; and I refer to it here, in order to prove the nature of the fever at that place.

The following extract is from the letter of Dr. T. M. Potter, U. S. Navy:

“U. S. Naval Hospital, near Portsmouth, March 25, 1848.”

“The cases of yellow fever which occurred in the Gulf Squadron were generally of a severe character, and those affected with it, whom I saw under your care in the Hospital at Salmadina, some of whom were sent from the ship to which I was attached, were not only sick enough to be put to bed, but were generally very ill, requiring, in my opinion, prompt and immediate attention.”

I will conclude this paper with a synopsis of the Pathology, Symptoms and Treatment of this disease.

Symptoms—Rigor; fever; injected eyes; pain in head, small of back and lower extremities; tenderness of epigastrium; emesis and black vomit.

Treatment—Bleeding; purgation; ptyalism, and counter-irritation.

Pathology—Thickening of the membranes of brain and spinal marrow, and hardening of their substances; almost cartilaginous firmness of liver, with discoloration; thickening and sphacelus of mucous-membrane of the stomach. These changes consequent upon meningitis, hepatitis and gastritis.

There is no disease more entirely under the control of medical treatment than yellow fever, nor is there any one more imperatively demanding it; and I feel a firm conviction of the truth and correctness of the principles herein stated.

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Very respectfully,

W. E. HORNER.

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